

Claims

1. An arrangement for clamping a thin rod (3) of glass or quartz having a diameter below 1 mm in two mutually-spaced clamping 5 locations for holding a said rod extended between the two clamping locations,

10 said arrangement comprising first clamping means arranged to clamp said rod (3) in a first said clamping location, said first clamping means having a first clamping member (22) with a clamp face (23) of substantially V-groove type, for receiving the rod in the groove (24), and a second clamping member (21) having a substantially flat opposing clamp face for retaining the rod in the groove,

15 **characterized** in that the first clamping member is movably arranged with respect to a framework of the apparatus and that the apparatus further comprises driving means for moving the first clamping member having the grooved clamp face towards 20 and away from the second clamping member for clamping and releasing a said rod, respectively.

2. An arrangement for clamping a thin rod (3) of glass or quartz having a diameter below 1 mm in two mutually-spaced clamping 25 locations for holding a said rod extended between the two clamping locations,

30 said arrangement comprising first clamping means arranged to clamp said rod (3) in a first said clamping location, said first clamping means having a first clamping member (22) with a clamp face (23) of substantially V-groove type, for receiving the rod in the groove (24), and a second clamping member (21) having a substantially flat opposing clamp face for retaining the rod in the groove,

**characterized** in that the arrangement further comprises driving means (26) adapted to move at least one of said clamping members for creating a rectilinear relative movement of said clamping members (21, 22) towards and away from each other  
5 for clamping and releasing a said rod, respectively.

3. An arrangement according to claim 1 or 2, **characterized** in that said clamping member (22) being movable for clamping and releasing a said rod is received in a guide (44) of the apparatus  
10 and removable from the apparatus by pushing and/or lifting it out of the guide for exchange.

4. An arrangement according to claim 3, **characterized** in that guide is constituted by a slot (44) having a bottom (42) on which  
15 said clamping member is intended to rest and lateral walls (43) intended to guide the clamping member in said movement, and that the clamping member (22) is removable from the apparatus by lifting it out of the guide.

20 5. An arrangement according to claim 3 or 4, **characterized** in that movable clamping member comprises a block-like piece (22) resting only through gravity in said guide.

25 6. An arrangement according to any of the preceding claims, **characterized** in that one (21) of said clamping members is fixed with respect to a framework (45) of the apparatus.

30 7. An arrangement according to any of the preceding claims, **characterized** in that it further comprises at least one member (14) having at least one inclined surface and means for moving said member laterally towards a rod being clamped in only a second of said two clamping locations before clamping it in the first clamping location through said first clamping means with the inclined surface (17, 18) into abutment against the rod for  
35 influencing the rod by sliding thereof upon said surface for

reaching the position desired for said first clamping location before clamping the rod in that location.

8. An arrangement according to claim 7, **characterized** in that it  
5 comprises one or more said members (14) having together at least two said inclined surfaces (17, 18), which are oppositely inclined with respect to a plane including said two clamping locations and adapted to be moved by said moving means (19) laterally towards said rod for moving the rod to a seat in an intersection between said two inclined surfaces (17, 18) as seen in the direction from one clamping location to the other.
9. An arrangement according to claim 7 or 8, **characterized** in that said inclined surface (17, 18) or surfaces is (are) designed  
15 for adjusting the height of a said rod (3) at said first clamping location before the latter is clamped there.
10. An arrangement according to any of the preceding claims, **characterized** in that it comprises a second clamping means (1) arranged to clamp said rod in a second said clamping location, that the second clamping means is movable in the longitudinal direction of a said rod extended between the two clamping locations, that the apparatus comprises means (12) for moving the second clamping means in said longitudinal direction for extending a rod clamped by said arrangement for applying a longitudinal tension load to the rod (3).  
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11. An arrangement according to claim 10, **characterized** in that it further comprises means (13) for measuring said tension load and means (40) for influencing said moving means (12) for adjusting the tension load on the basis of information about the tension load from said measuring means.  
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12. An arrangement according to claim 11, **characterized** in that said adjusting means comprises a computer (40) communicating  
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with the tension load measuring means (13) for adjusting said tension load to a value that may be set by the computer.

13. An arrangement according to any of the preceding claims,  
5 **characterized** in that it is adapted to hold optical fibres.
14. An arrangement according to any of the preceding claims,  
10 **characterized** in that it is adapted to hold said rods having a diameter below 600  $\mu\text{m}$ , below 300  $\mu\text{m}$  and preferably between 50 and 200  $\mu\text{m}$ .
15. An apparatus for cleaving thin rods (3) of glass or quartz having a diameter below 1 mm, comprising a rod cleaving blade (27), adapted to be brought into lateral contact with such a rod  
15 at a desired cleaving point between said two clamping locations, to achieve cleaving of said rod at said point, **characterized** in that it comprises an arrangement for clamping a said rod according to any of claims 1-14.
- 20 16. An apparatus according to claim 15, **characterized** in that it comprises an arrangement according to claim 10, and that the second clamping means thereof is adapted to clamp a said rod in a second said clamping location belonging to the part of the cleaved rod intended for later use.  
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- 30 17. An apparatus according to claim 16, **characterized** in that said means (12) for moving said clamping means (1) is adapted to automatically move the rod part clamped by said second clamping means away from the cleaving point upon cleaving of the rod as a consequence of said tension load applied therethrough.
- 35 18. An apparatus according to any of claims 15-17, **characterized** in that it further comprises a body (28) carrying the blade and driving means adapted to act upon said body for causing a relatively steady movement of the blade towards said desired

cleaving point while subjecting the blade to a relatively small-amplitude vibratory component of movement towards and away from said cleaving point superimposed to said relatively steady movement towards the cleaving point.

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19. An apparatus according to claim 18, **characterized** in that said body (28) is of a material varying its length through application of electric and/or magnetic fields therein, that said driving means is adapted to achieve said movements of the blade by influencing said body electrically and/or magnetically for creating length variations of the material thereof, and that the driving means is adapted to make the body and by that the blade vibrate with a said relatively small-amplitude component having a frequency below 1 kHz towards and away from the cleaving point for cleaving a said rod.

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20. An apparatus according to claim 19, **characterized** in that said driving means is adapted to make the blade vibrate with a frequency below 750 Hz, between 100 and 700 Hz or between 250 and 450 Hz.

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21. A method for clamping thin rods of glass or quartz having a diameter below 1 mm in two mutually-spaced clamping locations for holding the rod extended between these two clamping locations;

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in which said clamping is in a first clamping location carried out by creating a relative movement of a first clamping member (22) with a clamp face (23) of substantially V-groove type, for receiving the rod in the groove, and a second clamping member (21) having a flat opposing clamp face (25) for retaining the rod in the groove for clamping the rod,

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**characterized** in that in said clamping said first clamping member (22) having the groove is moved towards the second clamp-

ing member (21) being fixed with respect to a framework (45) of an apparatus for cleaving said rods for clamping a said rod.

22. A method for clamping thin rods of glass or quartz having a  
5 diameter below 1 mm in two mutually-spaced clamping locations  
for holding the rod extended between these two clamping locations;

10 in which said clamping is in a first clamping location carried out  
by creating a relative movement of a first clamping member (22)  
with a clamp face (23) of substantially V-groove type, for re-  
ceiving the rod in the groove, and a second clamping member  
(21) having a flat opposing clamp face (25) for retaining the rod  
in the groove for clamping the rod,

15 **characterized** in that in said clamping at least one of said  
clamping members is moved for creating a rectilinear relative  
movement of said clamping members towards each other for  
clamping said rod.

20 23. A method according to claim 22, **characterized** in that said  
second clamping member (21) is kept fixed with respect to a  
framework (45) of an apparatus for cleaving thin rods while  
moving said first clamping member (22) having the grooved  
25 clamp face in said clamping.

24. A method according to any of claims 21-23, **characterized**  
in that it further comprises a step of adjusting the position of a  
rod being clamped in a second of said two clamping locations  
30 before clamping it according to said clamping step in the first  
clamping location, in which at least one member (14) having at  
least one inclined surface (17, 18) is moved laterally towards  
said rod with the inclined surface into abutment against the rod  
for influencing the rod by sliding thereof upon said surface for  
35 reaching a position desired for said first clamping location.

25. A method according to claim 24, **characterized** in that in said adjusting step one or more said members (14) having together at least two said inclined surfaces (17, 18), which are oppositely inclined with respect to a plane including said two 5 clamping locations, are moved laterally towards said rod for moving the rod to a seat in an intersection between said two inclined surfaces as seen in the direction from one clamping location to the other.
- 10 26. A computer program directly loadable into the internal memory of a computer, comprising software code portions for controlling the steps of any of claims 21-25 when said program is run on the computer.
- 15 27. A computer program according to claim 26, provided at least partially through a network as the Internet.
- 20 28. A computer readable medium, having a program recorded thereon, where the program is to make a computer control the steps of any of claims 21-25.